DESIGN STANDARDS

The design and implementation of the projects identified as the preferred alternative will be performed in accordance with industry standards, regulatory requirements, and local government standards. This section presents the accepted industry resources and which elements apply to the proposed projects.

American Water Works Association (AWWA)

The following are AWWA standards that will be applicable to the facilities in the proposed projects:

- A97-100 - Groundwater and Well
- C104, C105, C110, C111, C115, C116, C150, C151, and C153 - Ductile Iron Pipe and Fittings
- C200, C203, C205, C205, C206, C207, C208 - Steel Pipe
- C500, C501, C504, C540 - Valves and Hydrants
- C600s - Disinfection Facilities
- C900s - Plastic Pipe
- C901, C906 - HDPE Pipes

Florida Department Of Environmental Protection (FDEP)

The following are FDEP regulations (Florida Administrative Code) that are applicable to the facilities that are being considered:

- 62-40 - Water Policy
- 62-520 - Ground Water Classes, Standards, and Exemptions
- 62-521 - Wellhead Protection
- 62-522 - Ground Water permitting and Monitoring Requirements
- 62-524 - New Potable Water Well Permitting in Delineated Areas
- 62-528 - Underground Injection Control
- 62-531 - Water Well Contractors
- 62-532 - Water Well Permitting and Construction Requirements
- 62-550 - Drinking Water Standards, Monitoring, and Reporting
- 62-600 - Domestic Wastewater Facilities (Reuse requirements)
- 62-650 - Water Quality Based Effluent Limitations
- 62-520 - Ground Water Classes, Standards, and Exemptions

Class I reliability, as defined by the US EPA and stated in FDEP's regulations refers to reliability of mechanical, electrical, and fluid systems. For major equipment items (pumps, blowers, etc.), the

capacity and operations should be designed for the maximum design flows with the largest unit out of service.

United States Environmental Protection Agency (US EPA)

The Class V - Underground Injection Control Study, Volume 21-Aquifer Recharge and Aquifer Storage and Recovery Well, September 1999. This document presents best management practices for aquifer storage and recovery (ASR) wells.

Ten States Standards / Recommended Standards for Water Works Great Lakes-Upper Mississippi River Board (2003 Edition)

These standards include design guidelines for :

- Treatment – Part 4
- Pumping Facilities – Part 6
- Finished Water Storage – Part 7
- Distribution System Piping and Appurtenances – Part 8

ASR WELL STANDARDS

Criteria and standards for Class V wells are addressed in Chapter 62-528 FAC. ASR systems are categorized Class V Group 7. For these wells, standards of design and construction are required prior to requesting any construction permit. In order to be able to operate the well, it will be necessary to demonstrate that the well operation will not adversely affect any underground sources of drinking water (USDW). Approval to operate the system by the FDEP will be subject to operating and reporting requirements, such as drinking water standards.

Surface water sources are a major part of the RIDS program. Therefore, ASR wells receiving surface water are a Under Direct Influence (UDI) of surface water, which will require more extensive sampling and monitoring requirements. This needs to be considered from a cost and operations standpoint.

Siting and Construction Requirements

Specific construction standards for Class V wells have not been enacted by Florida because of the variety of Class V wells and their uses. Instead, the state requires the well to be designed and constructed for its intended use, in accordance with good engineering practices, and approves the design and construction through a permit. The state can apply any of the criteria for Class I wells to the permitting of Class V wells, if it determines that without such criteria the Class V well may cause or allow fluids to migrate into a USDW and cause a violation of the state's primary or secondary drinking water standards, which are contained in Chapter 62-550 of the FAC. However, if the injectate meets the primary and secondary drinking water quality standards and the minimum criteria contained in Rule 62-520-400 of the FAC, Class I injection well permitting standards will not be required.

Class V wells are required to be constructed so that their intended use does not violate the water quality standards in Chapter 62-520 FAC at the point of discharge, provided that the drinking water standards of 40 CFR Part 42 (1994) are met at the point of discharge.

Water Quality

The following are federal rules and programs that regulate ASR well water quality:

- Total Trihalomethane Rule (TTHMs)
- Surface Water Treatment Rule
- Total Coliform Rule
- Interim Enhanced Surface Water Treatment
- Stage 1 Disinfection Byproducts Rule
- Radon Rule
- Ground Water Rule

These water quality requirements are applicable to all to ASR well projects.

Siting and Construction

In order to determine the location and spacing of the wells the following should be considered:

- Background basin hydrology and natural recharge sources and location
- Pumping patterns
- Discharge areas
- Proposed storage area

Although Florida has not enacted standards for Class V wells, good engineering practices are required to approve construction permits for the wells. If the water to be injected shall meet the following requirements:

- Primary and Secondary Water Quality Standards (Chapter 62-550 FAC)
- Minimum criteria in Rule 62-520-400 of FAC- Ground Water Classes, Standards, and Exemptions/ Minimum Criteria for Ground Water

If the above standards are not met and if it is determined that the Class V criteria may allow stored water to migrate into USDW, the FDEP will require that Class I well criteria be met for the design and construction of the well.

Operation requirements

Class V wells are required to operate in a manner that does not present a hazard to USDW and to meet the water quality standards presented in Rule 62-520 FAC. The following operating and maintenance practices are recommended by Pyne (1995) for successful operations of ASR wells:

- Periodic change in operating mode
- Backflushing to waste during recharge

- Trickle flow of chlorinated water
- Calibration of pressure gauges
- Monitoring
- Annual water accounting or water balance
- Periodic review of operating water quality data

Monitoring

Only wells with injectate being treated by a permitted drinking water facility in accordance with rules 62-528.615(1)(a)2 FAC do not require monitoring. None of the injectate for the proposed projects in this Sub-Region is expected to originate from drinking water treatment facility; thus, monitoring requirements will be included in the permits.